U.S. DEPARTMENT OF COMMERCE
National Technical Information Service

PB-261 157

Hazardous Waste Disposal Damage Reports

Environmental Protection Agency, Washington, D C

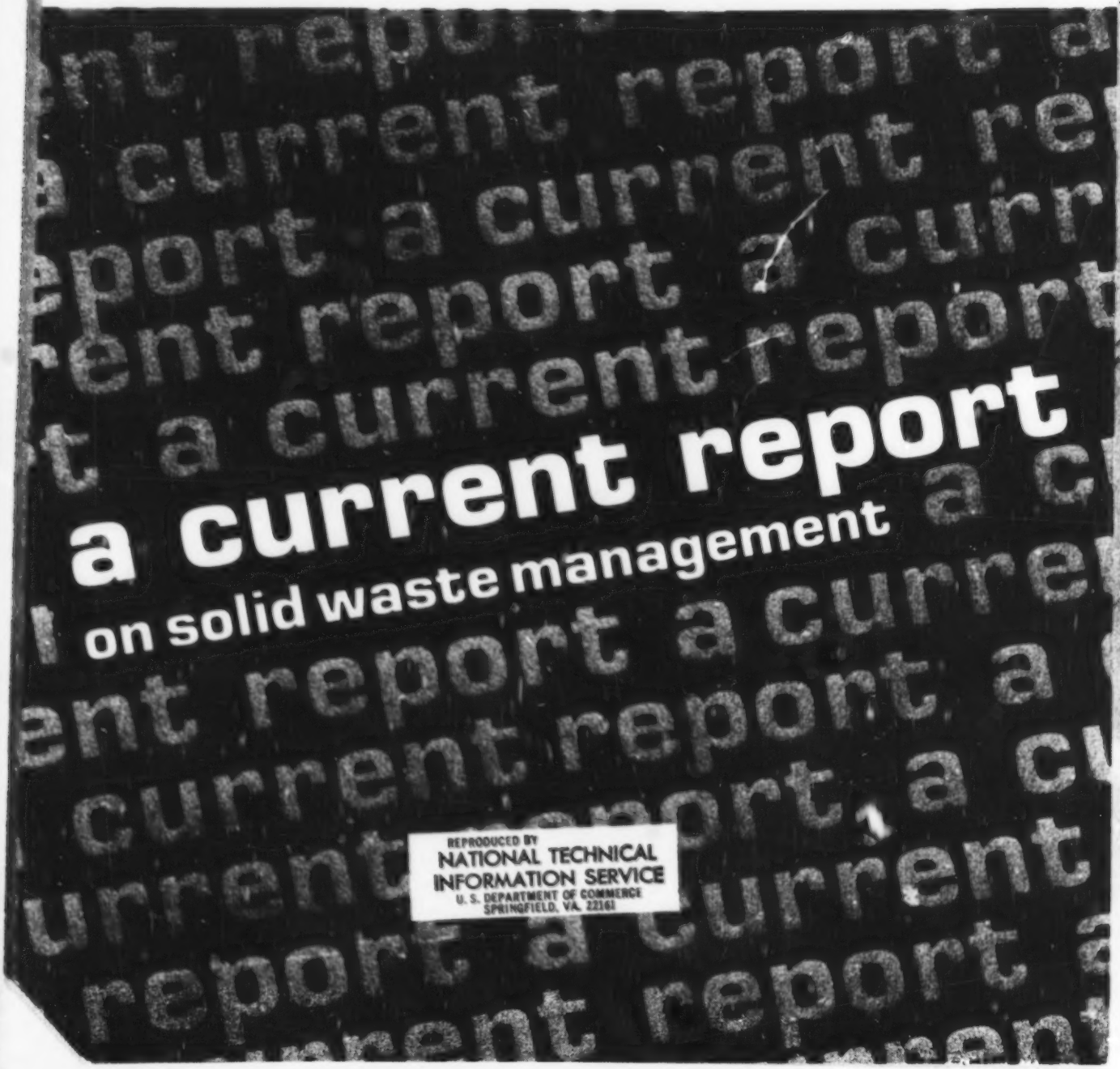
Jun 75

349080

EPA/530/SW-151
JUNE 1975

PB 261 157

hazardous waste disposal damage reports



REPRODUCED BY
NATIONAL TECHNICAL
INFORMATION SERVICE
U. S. DEPARTMENT OF COMMERCE
SPRINGFIELD, VA. 22161

HAZARDOUS WASTE DISPOSAL DAMAGE REPORTS

This publication (SW-151), the first in a series of reports
to document incidents of improper land disposal of hazardous wastes,
was prepared by the Office of Solid Waste Management Programs

U.S. ENVIRONMENTAL PROTECTION AGENCY
1975

Reprinted with minor changes
September 1975

HAZARDOUS WASTE DISPOSAL DAMAGE REPORTS

On June 30, 1973, the U.S. Environmental Protection Agency (EPA) submitted a report to the U.S. Congress on the subject of hazardous waste disposal as had been required by the Solid Waste Disposal Act Amendment of 1970.[1] That report concluded that the prevailing methods of land disposal of hazardous wastes are largely inadequate and cited numerous case studies pertaining to improper hazardous waste management. Since the 1973 Report to Congress, EPA has continued to study hazardous waste disposal. A portion of these studies has consisted of more detailed investigations of improper land disposal practices to determine their impact on public health and on the environment. Case studies have been compiled within the framework of these investigations.

The problems associated with improper land disposal of hazardous wastes--unlike the problems of air and water pollution--have not been widely recognized by the public, although the damages may be as severe and difficult to remedy. In addition, the hazardous waste disposal problem continues to become even more significant, as the progressive implementation of air and water pollution control programs, ocean dumping bans, and cancellation of pesticide registrations results in increased tonnage of land-disposed wastes, with adverse impact on public health and the environment. The problem is manifested in ground-water contamination via leachate, surface water contamination via runoff, air pollution via open burning, evaporation, sublimation and wind erosion, poisonings via direct contact and through the food chain, and fires and explosions at land disposal sites.

The objective of publishing these damage reports is to bring about national awareness of the problem, which is essential to its solution. These reports will be published from time to time as resources permit. No systematic effort has been made to concentrate on any one parameter of interest, be it geographical, industrial, type of disposal site, or type of damage. Similarly, it is not the purpose of this series of reports to single out any particular person, firm, or industry. Cases are investigated as information becomes available. The only criteria used in the selection of incidents for these reports are:

- severity of damage
- availability of supporting information
- availability of EPA personnel for investigation

The data base for these damage reports varies widely. In some instances, official public records will be available for documentation; however, in most cases the reports will have to be based on inspection

by EPA personnel, interviews with parties involved or having first-hand knowledge of specific incidents, technical investigations by consulting firms, newspaper accounts, etc.

The authority for the publication of such reports derives from Sec. 204 (a)(1) and (b)(1) of the Solid Waste Disposal Act of 1965 (P.L. 89-272)--as amended by P.L. 91-512, P.L. 93-14, and P.L. 93-611.

CONTENTS

Report	Page
1. Arsenic Poisoning in Minnesota	1
2. Industrial Waste Disposal on Farmland in Illinois . . .	3
3. Fatality at a New Jersey Industrial Landfill	6

HAZARDOUS WASTE DISPOSAL
DAMAGE REPORT

March 7, 1975

Arsenic Poisoning in Minnesota

1. Personal Damage - Eleven persons developed arsenic poisoning. Two required hospitalization and treatment.

2. Environmental Damage - Contamination of the soil and groundwater

3. Economic Damage - Discontinued usage of contaminated well. Installation of public water supply cost approximately $3,000. Removal and safe disposal of contaminated soil is estimated at $25,000.

4. Cause of Problem - Subsurface migration of arsenic compound.

5. Type and Quantity of Hazardous Waste Involved - Grasshopper bait, consisting of arsenic trioxide, bran, sawdust, and molasses. Total quantity disposed estimated at less than 50 pounds.

6. Source of Waste - Local farmers

7. Date of Incident - Burial of grasshopper bait estimated between 1934 and 1936. First case of illness reported in May 1972, with other cases following during the next 10 weeks.

8. Location - EPA Region V, Minnesota, Perham

9. Status - Problem of how to deal with contaminated soil still requires resolution. Samples from 12 nearby wells are being analyzed at six-month intervals by the State Health Department.

10. Remedial Action Taken - The well has been capped. Cost considerations have prevented permanent correction of the situation at this time.

11. Legal Action Taken - None

12. Remarks - In May 1972, a local building contractor occupied a new office and warehouse structure at the outskirts of Perham, a town of 1900 residents in western Minnesota. At that time, a well was drilled to supply drinking water for about 13 people who worked on the premises.

Early in May, five employees became ill with gastrointestinal symptoms. Following this, and continuing throughout the next 10 weeks, other employees also became ill. Arsenic poisoning was determined to be the cause, which affected a total of 11 out of 13 persons exposed to the water. Two required hospitalization and treatment. One of the victims lost the use of his legs for about six months due to severe neuropathy. The medical aspects of this groundwater contamination incident have been well documented by Dr. E. J. Feinglass.[2]

Chemical analysis of samples taken from the affected well established arsenic concentrations of up to 21,000 ppb. (The U.S. Public Health Service drinking water standard for arsenic is 50 ppb.) As Dr. Feinglass pointed out in his article, the particularly serious consequences of chronic arsenic poisoning were probably avoided in this instance because of the extremely high concentration of arsenic in the drinking water. The acute course of the illness allowed early recognition of the problem.

The source of the well water contamination has been traced back to the mid-1930's, at which time grasshoppers had constituted a serious problem to farmers in the area. Some old-timers recall that excess grasshopper bait had been buried at the former County Fairgrounds, in a corner which was used as the village dump in those days. That area is now directly adjacent to the new facilities of the building contractor whose well became contaminated.

The exact area of disposal was located approximately 20 feet from the well. The well is 31 feet deep and the arsenic trioxide was buried at a depth of about 7 feet. Analysis of soil samples established a maximum arsenic concentration of 40% at the spot where a white crystalline material was found. The Minnesota Department of Agriculture has estimated that less than 50 pounds of grasshopper bait was disposed in the trench about 40 years ago.

Several options have been proposed for solving the problem. These include the following: (a) removal of approximately 2,000 cubic yards of contaminated soil to sealed vaults; (b) chemical fixation of the soil; and (c) covering the area with asphalt to retard further leaching of arsenic into the groundwater. The estimated costs of these solutions range from $25,000 to $2,500. Due to budgetary considerations, the problem has not yet been resolved. There are current plans to install a monitoring well in the immediate vicinity in the direction of the estimated groundwater flow.

HAZARDOUS WASTE DISPOSAL
DAMAGE REPORT

March 7, 1975

Industrial Waste Disposal on Farmland in Illinois

1. Personal Damage - None

2. Environmental Damage - Contamination of the soil, surface- and ground-waters with toxic materials; destruction of wildlife, stream-dwelling organisms, and local vegetation

3. Economic Damage - In excess of $250,000 has been spent to date by one property owner for clean-up and monitoring operations; at least three cattle were killed by cyanide poisoning.

4. Cause of Problem - Dumping and burying of hazardous industrial wastes on land

5. Type and Quantity of Hazardous Waste - At least 1,511 containers (mostly 55-gal. and 30-gal. drums) of industrial wastes containing cyanides, heavy metals, and miscellaneous other materials

6. Sources of Waste - Mostly metal finishing operations

7. Date of Incident - Three dead cattle discovered on May 20, 1974; however, the dumping had been going on for an unknown number of years until about 1972

8. Location - EPA Region V, Illinois, near Byron, on the Johnson Property and the former Dirks Farm, which was purchased by the Commonwealth Edison Company in 1973

9. Status - The dumping and burying ceased around 1972, but the disposal site has sustained long-range environmental damage, which is particularly evident during periods of heavy rainfall. An unknown quantity of deteriorating drums of chemical wastes are estimated to be still buried at the Johnson Property.

10. Remedial Action Taken - Commonwealth Edison's contractor, the Conservation Chemical Company, removed a total of 1,511 containers from the former Dirks Farm for controlled disposal. Of this quantity, 576 fifty-five gal. drums and 425 thirty-gal. drums contained spent cyanides, which were incinerated. Earthen dams and trenches were constructed to confine the toxic runoff, which was treated with calcium hypochlorite to destroy the cyanide. A surface- and ground-water monitoring

program was initiated. No known remedial action has been taken at the adjacent Johnson Property.

11. Legal Action Taken - In December 1974, the State Attorney General Office, at the request of the Illinois EPA, filed a complaint against Byron Salvage Company and its listed owners, Mr. and Mrs. W.E. Johnson. The complaint alleges that the company allowed contaminants to be placed on land so as to create a water pollution hazard; polluted Woodland Creek with discharges of cyanide, cadmium, copper, iron, lead, manganese, nickel, silver and zinc; conducted a refuse disposal operation without a permit; contaminated underground water with phenol, cyanide and cadmium; and did not have a state wastewater discharge permit.

12. Remarks - In May 1974, three dead cattle were discovered on Commonwealth Edison Company's recently acquired property (formerly known as the Dirks Farm), and pathological examination established that the cattle had died of cyanide poisoning. Further investigation revealed that the approximately 5-acre area, which is part of a large property set aside for a nuclear power plant, had been for several years a repository of large quantities of toxic industrial wastes.

According to information furnished by the Illinois EPA, Mr. Johnson, owner of the Byron Salvage Company, initially hauled industrial wastes to his own property for dumping and burial. Later, Mr. Johnson allegedly negotiated with Mr. Dirks, owner of the neighboring farm property, for permission to dump more industrial wastes there. In 1974, when Commonwealth Edison Company learned of the potential problems associated with its acquired property, it hired the consulting firm of Dames and Moore to study the nature and magnitude of the environmental damage and to recommend a proper clean-up procedure. Dames and Moore prepared a comprehensive study which documents the substantial damage to wildlife (birds, downstream aquatic community, stream bottom-dwelling organisms, frogs, etc.) and local vegetation (trees, shrubs, etc.). Also, the study points out the severity of the contamination of nearby soils, vegetation, and surface- and ground-waters by toxic materials. The following tabulation will serve to illustrate the contamination of the surface-water runoff which ultimately enters the Rock River, situated 1 1/2 miles east of the site:

Contaminant	Maximum Concentration Detected in Runoff (parts per billion	U.S. Public Health Service Drinking Water Standards (parts per billion)	
Arsenic	60	50	
Cadmium	340	10	
Chromium	17,200	50	(W.H.O. standard)
Cyanide	365,000	200	
Phenols	8	1	(recommended)

Ongoing surface- and ground-water monitoring efforts by Commonwealth Edison testify to the long-range nature of the problem posed by toxic pollutants that had drained into the soil. Also, it is too early to predict what time period will be required before farm crops can be safely harvested on the affected property. As far as the Johnson Property is concerned, an unknown quantity of chemical wastes is estimated to be buried there, awaiting the outcome of current legal proceedings.

There are two recent significant developments surrounding this case study:

1. In February 1975, Mr. Johnson brought to the attention of local public health officials several additional sites within one mile of his property where other parties allegedly dumped liquid industrial wastes on land. These sites are currently being investigated.

2. As of March 1975, owners of at least forty-six private wells within a three-mile radius of the Johnson Property have been warned by the Illinois Department of Public Health that their drinking water is unsafe due to unacceptable levels of lead and mercury. One of the wells was found to have an unsafe concentration of cadmium and many contained cyanide; however, the cyanide concentrations were within U.S. Public Health Service drinking water standards. Investigations by State authorities are in progress to determine the source(s) of these contaminants.

HAZARDOUS WASTE DISPOSAL
DAMAGE REPORT

March 7, 1975

Fatality at a New Jersey Industrial Landfill

1. Personal Damage - Bulldozer operator killed in explosion at landfill

2. Environmental Damage - None which resulted from incident

3. Economic Damage - Bulldozer destroyed; approx. $91,000 damage

4. Cause of Problem - Explosion while burying and compacting drums of unidentified industrial waste chemicals

5. Type and Quantity of Hazardous Waste Involved - From one to five 55-gallon drums of unidentified chemicals

6. Source of Waste - Unknown industrial origin

7. Date of Incident - October 11, 1974

8. Location - EPA Region II, New Jersey, Edison Township, Kin-Buc Landfill

9. Status - Landfill remains active. The case was investigated by the Occupational Safety and Health Administration (OSHA) and New Jersey State authorities.

10. Remedial Action Taken - Management has agreed to make every effort to keep out unknown chemical wastes.

11. Legal Action Taken - The OSHA issued six citations (covering thirty-six items) for violation of the Occupational Safety and Health Act of 1970. A formal settlement of contested items was reached between OSHA and the management on March 4, 1975.

12. Remarks - The Kin-Buc Landfill, located on 30 acres adjacent to the Raritan River, has received both municipal and industrial wastes for about twelve years. It is owned by Kin-Buc, Inc., a subsidiary of Scientific, Inc., of Scotch Plains, N.J.

According to Mr. James Stroin, Vice President of Scientific, the landfill receives approximately 200 truckloads of waste per day, 25% of which is industrial waste. This includes wastes from such industrial categories as organic and inorganic chemicals, pharmaceuticals, paints, plastics, and others.

The wastes are delivered to the site in tank trucks and in containers. Bulk liquids are poured out of the tank trucks on top of the previously deposited waste, while those in containers are buried and then compacted with bulldozers. Mr. Stroin explained that two tests are conducted as a means of identifying the wastes. The first, a test for flammability, is conducted by igniting a sample in a glass beaker. The second is pH testing by indicator paper.

The acceptance of unidentified chemical wastes at landfills has been deemed an unsafe practice by the State of New Jersey and is specifically prohibited in recently promulgated solid waste disposal regulations. However, these regulations had been suspended by court order at the date of the explosion; they have since been reinstated.

According to the OSHA investigation, eleven 55-gallon drums of unknown chemicals had been stored at the site for about six weeks prior to the explosion. On October 11, 1974, one of the managers of the Chemical Waste Division of Scientific, Inc., told an employee to remove these drums for burial. Mr. Donald Amatel, one of the two bulldozer operators working there at the time, had covered five drums of the unidentified industrial waste chemicals and had begun the compacting operation when an explosion occurred. According to the OSHA investigation, a large flame enveloped the bulldozer. Mr. Amatel jumped out of his cab and another explosion followed, which caused burns covering approximately 85% of his body and destroyed the bulldozer beyond recovery. Mr. Amatel died the following day. He had been active in his line of work for about fifteen years.

When interviewed by an EPA official, Mr. Stroin attributed the fatal outcome of the accident to the faulty judgment of the bulldozer operator. He indicated that Mr. Amatel should have stayed in the cab and backed out with the equipment to avoid injury. Witnesses, however, stated that this would not have been possible. In response to questions about possible environmental problems with the landfill, Mr. Stroin conceded that there were occasional problems with contaminants being drained from the landfill after periods of heavy rainfall.

For the first ten months of 1974, six other obviously chemical waste disposal-related occupational injuries were recorded in the Kin-Buc logs, the maintaining of which is required under the Williams-Steiger Occupational Safety and Health Act of 1970 (excluded from this requirement are minor injuries requiring only first aid treatment). The recorded injuries affected two bulldozer operators, a laborer, and two drivers. These injuries, as obtained from the OSHA files, are as follows:

1. Eye irritation sustained while bulldozer operator was pushing drum which split, squirting liquid into eyes.

2. Smoke inhalation which caused respiratory and stomach conditions while operator was fighting a fire on a bulldozer.

3. Conjunctivitis of eyes caused by fumes from waste products. Safety glasses were being worn at the time of injury.

4. Burned foot when driver stepped out of truck into a hole containing 250°F acid waste.

5. Chemical burns to hands and other parts of body as a result of pushing a drum with bulldozer. The drum split open and liquid squirted out.

6. Sustained burn of the cornea when dumping acid from a tank truck.

REFERENCES

1. U.S. Environmental Protection Agency, Office of Solid Waste Management Programs. Disposal of hazardous wastes; report to Congress. Environmental Protection Publication SW-115 Washington, U.S. Government Printing Office, 1974. 110 p.

2. Feinglass, E.J. Arsenic Intoxication from well water in the United States. The New England Journal of Medicine, Vol. 288, No. 16, pp. 828-830 (April 19, 1973).

μσ1183aR

BIBLIOGRAPHIC DATA SHEET	1. Report No. EPA/530/SW-151	2.	3. Recipient's Accession No.
4. Title and Subtitle Hazardous waste disposal damage reports			5. Report Date Jun 1975 6.
7. Author(s)			8. Performing Organization Rept. No.
9. Performing Organization Name and Address Same as Box 12			10. Project/Task/Work Unit No. 11. Contract/Grant No.
12. Sponsoring Organization Name and Address U.S. Environmental Protection Agency Office of Solid Waste Management Programs			13. Type of Report & Period Covered 14.

15. Supplementary Notes

A current report on solid waste management

16. Abstracts

This publication is the first in a series of reports to document incidents of improper land disposal of hazardous wastes

17. Key Words and Document Analysis. 17a. Descriptors

17b. Identifiers/Open-Ended Terms

17c. COSATI Field/Group

18. Availability Statement	19. Security Class (This Report) UNCLASSIFIED	21. No. of Pages 15
	20. Security Class (This Page UNCLASSIFIED	22. Price 3.50

FORM NTIS-35 (REV. 10-73) ENDORSED BY ANSI AND UNESCO. THIS FORM MAY BE REPRODUCED USCOMM-DC 8265-P74

An environmental protection publication in the solid waste management series (AW-151). Mention of commercial products does not constitute endorsement by the U.S. Government. Editing and technical content of this report were accomplished by the Hazardous Waste Management Division of the Office of Solid Waste Management Programs.

Single copies of this publication are available from Solid Waste Information, U.S. Environmental Protection Agency, Cincinnati, Ohio 45268.